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(54) **Concrete surface-imprinting tool**

(57) A surface imprinting tool 24 comprises a web of pattern-imprinting bars 25, each having an imprinting edge 26, and all irregularly disposed in an asymmetrical web so that contiguous imprint-free zones 27 are different. Abutment members 30 with faces normal to the imprinting plane register with adjacent faces on the neighbouring imprinting tool. Hammering bosses 36 upon the imprinting tool enable it to be impacted. An hexagonal peripheral support frame 28 attached to the bar terminations supports the pattern-imprinting bars 25, which also have reinforcing struts 29.

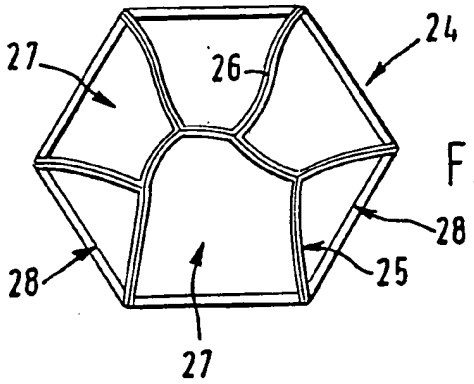

FIG 7b

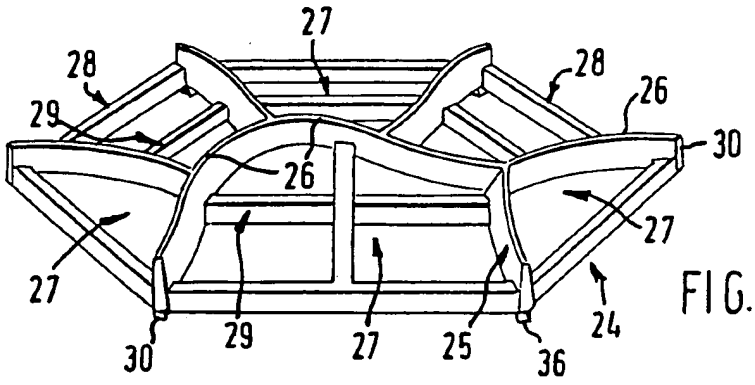

FIG.8

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FIG.1a

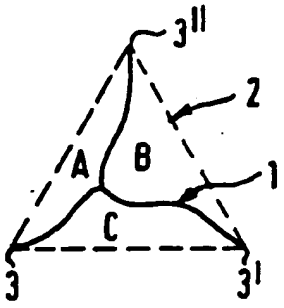

FIG.1b

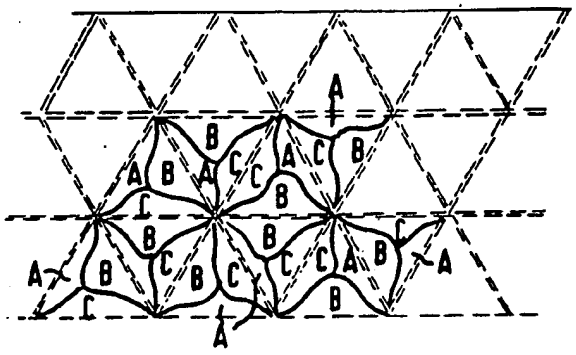

FIG.2a

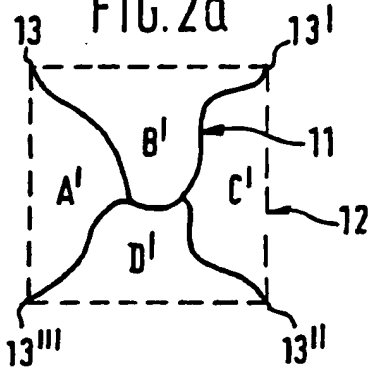

FIG.2b

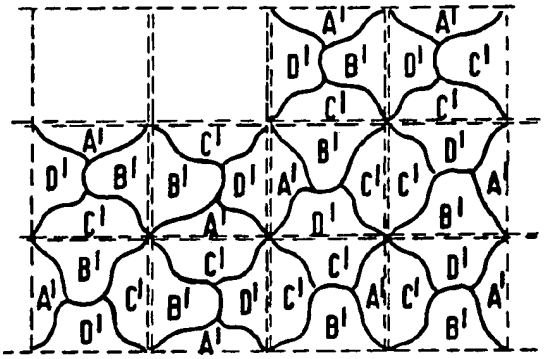

FIG.3a

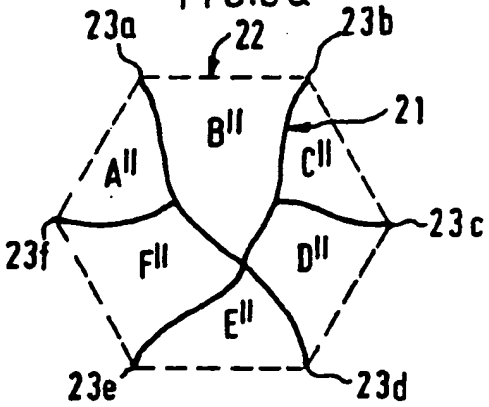

FIG.3b

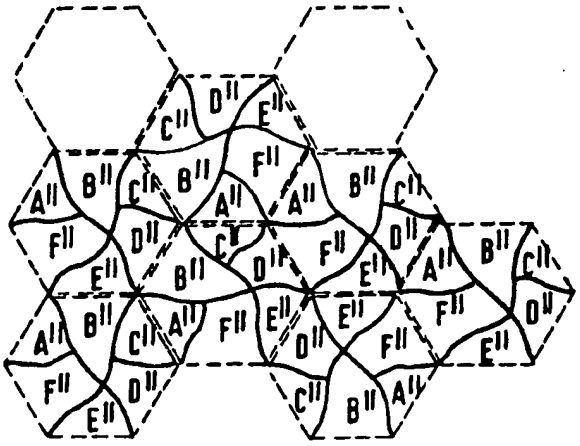

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FIG.4

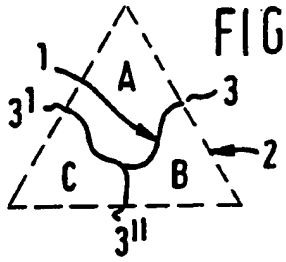


FIG.5a

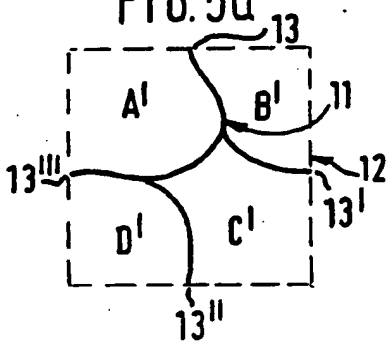


FIG.5b

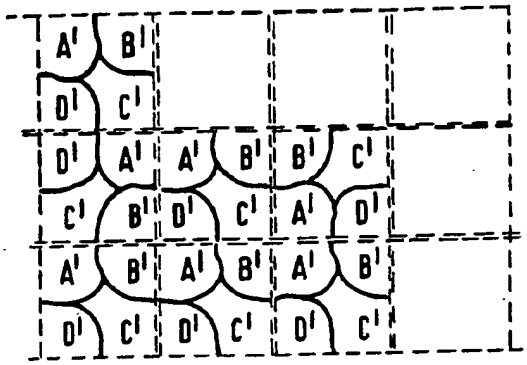


FIG.6a

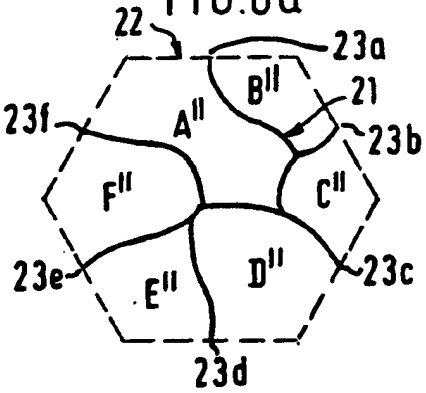
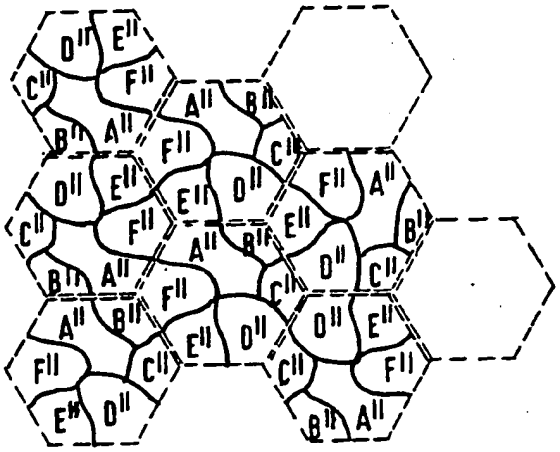


FIG.6b



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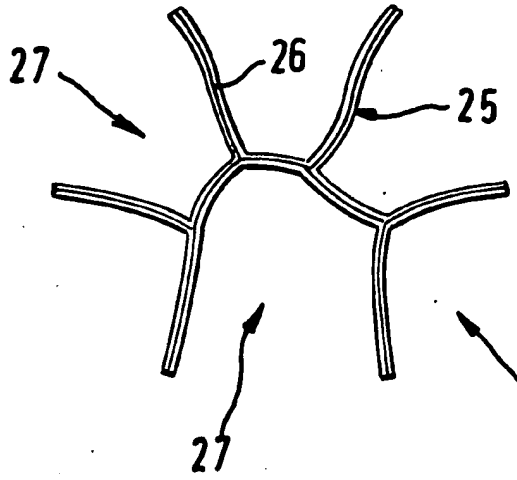

FIG.7a

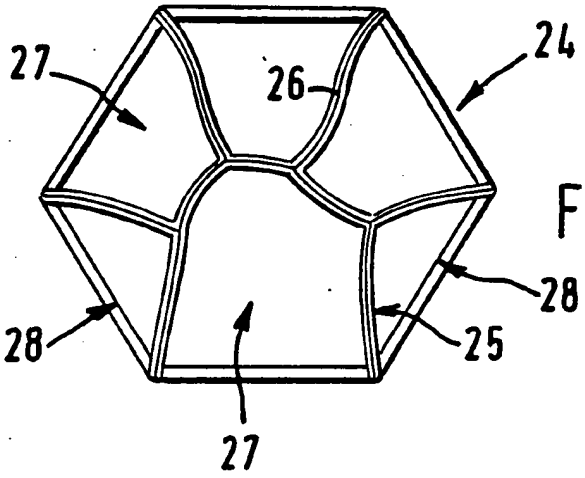

FIG 7b

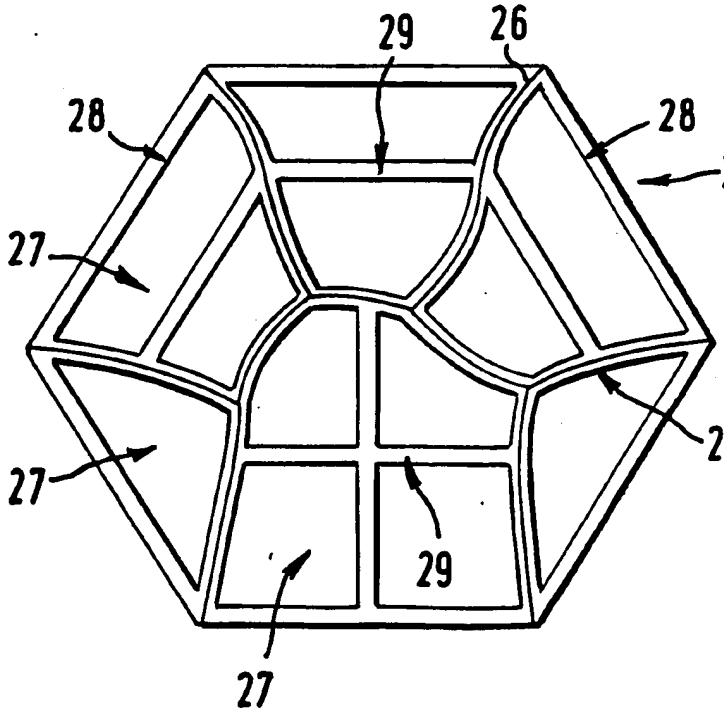

FIG.7c

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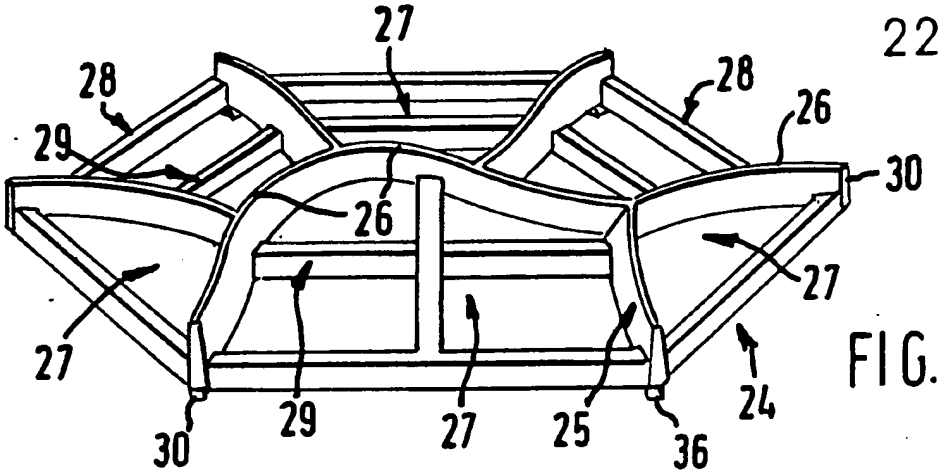

FIG.8

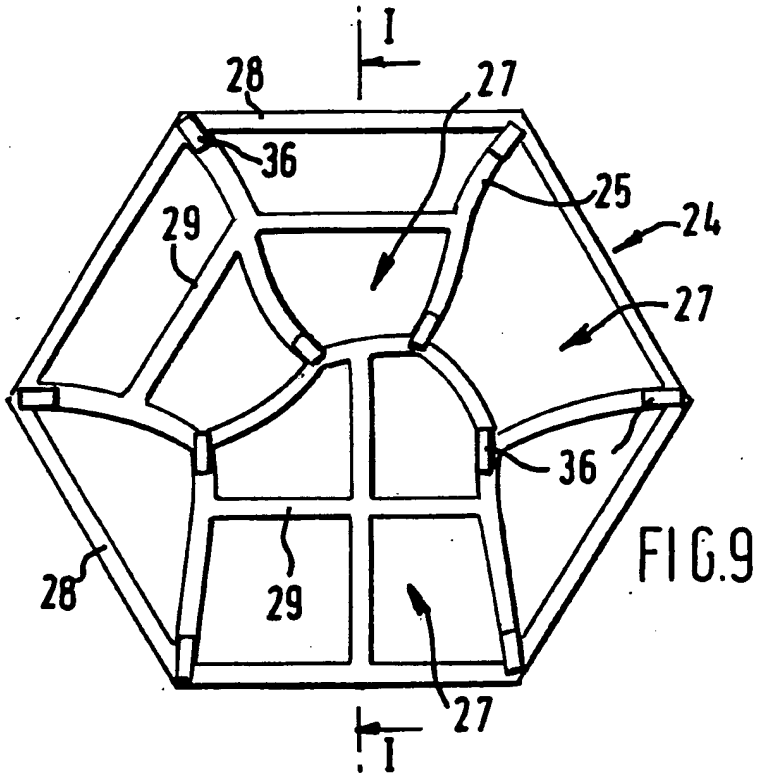

FIG.9

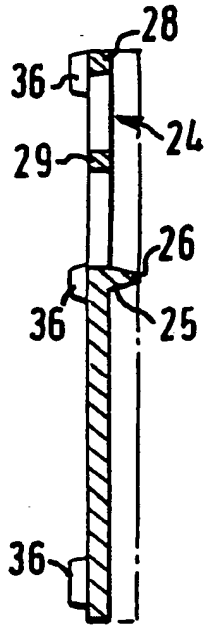

FIG.10

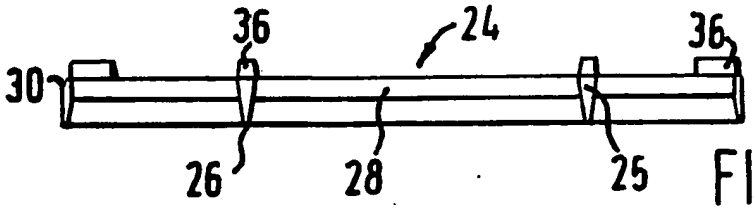

FIG.11

FIG.12a

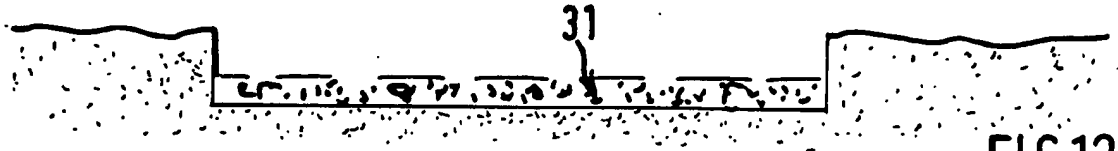

FIG.12b

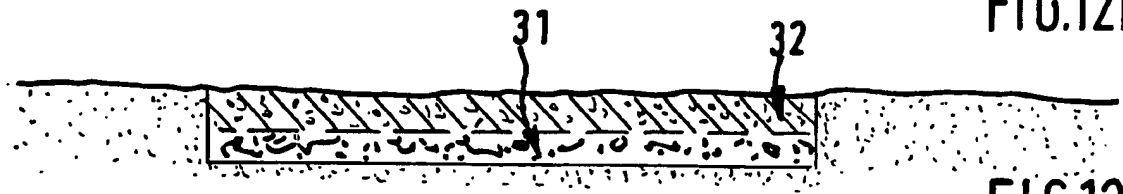

FIG.12c

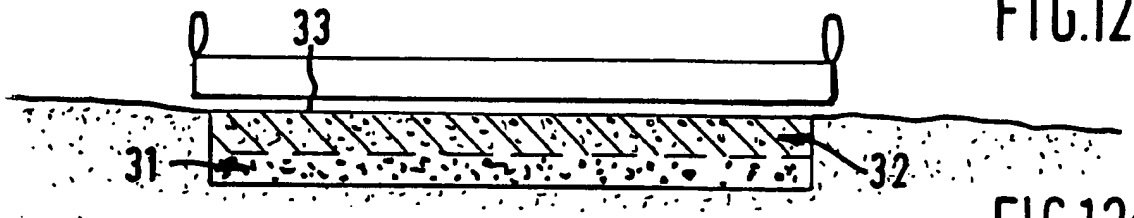

FIG.12d

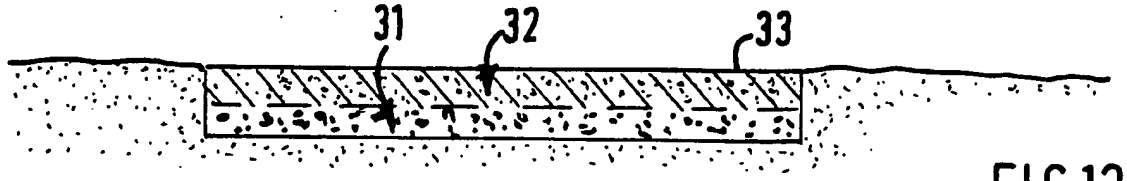

FIG.12e

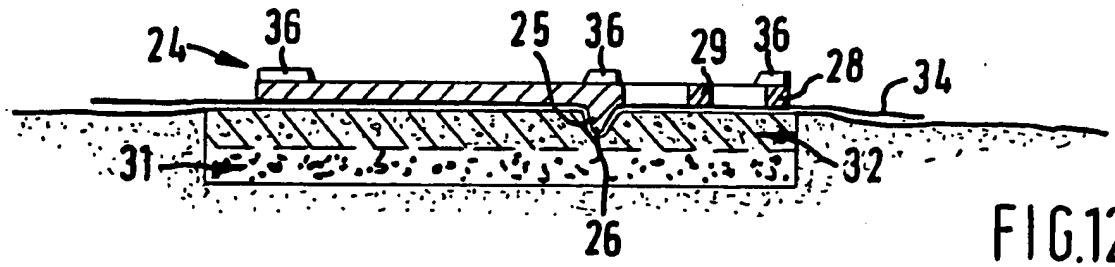

FIG.12f

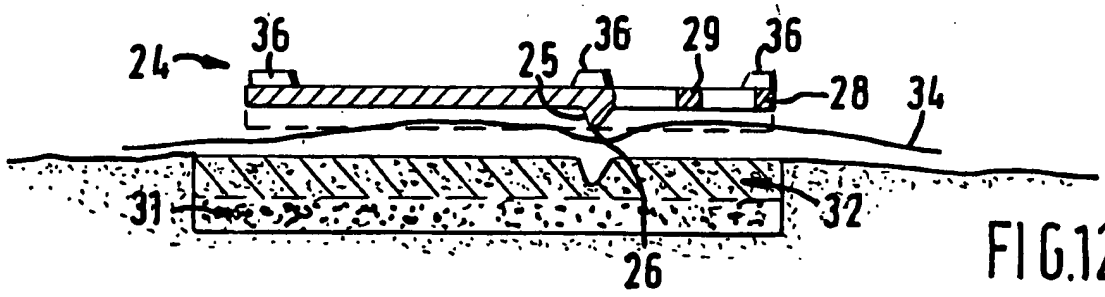

FIG.12g

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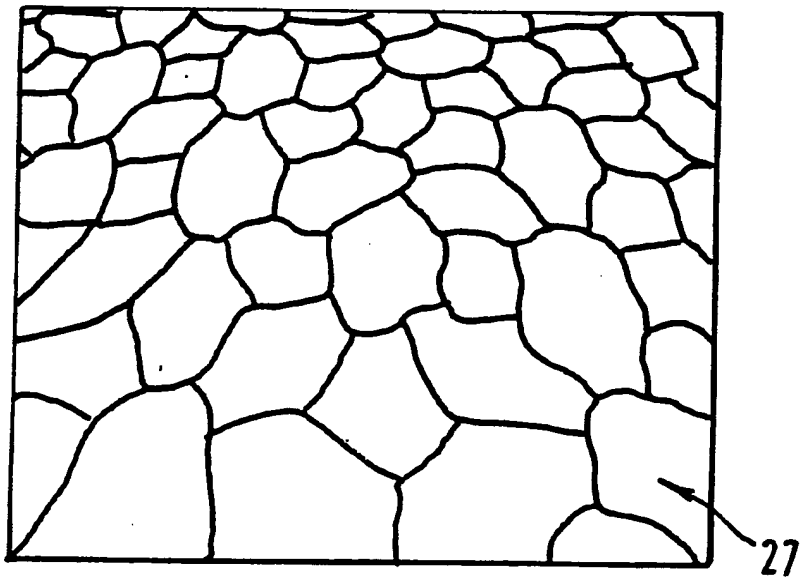

FIG.13

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SURFACE-IMPRINTING TOOL AND METHOD

This invention concerns a surface-imprinting tool, for imprinting a quasi-random pattern in the surface of setting but still unset paving materials, especially concrete-type material, and a method of imprinting such surfaces therewith.

In recent years we have developed and introduced a method of imprinting the surface of un-set, concrete-type paving material, so that the set material bears an imprinted pattern which simulates (and often outclasses) the effect achieved with other, more traditional paving materials such as cobblestones, bricks, blocks, paving slabs and the like.

Briefly-stated, our surface imprinting method involves the successive steps of (a) forming an underlying, load-bearing foundation layer, (b) pouring thereon a layer of wet concrete-type mixture, (c) tamping and screeding that layer to form a smooth cement/sand surface thereon, (d) optionally but usually scattering mineral pigments upon said still-unset surface, trowelling in said pigments and again tamping and screeding the pigmented surface of the wet cement/sand mixture, (e) covering the still only semi-set smooth surface with a thin, deformable synthetic

resin membrane, (f) assembling an array of juxtaposed surface-imprinting tools over the membrane-covered surface and gently impacting them to imprint the surface through the membrane, then (g) removing the array of surface-imprinting tools and the synthetic resin membrane from the thus-imprinted surface of the concrete-type material, and optionally but desirably (h) applying an appropriate sealant to the smooth, set, pigmented and imprinted surface.

The results thus achieved can be remarkably evocative of the best effects achievable with more traditional paving materials, and of course at much reduced cost in terms of both materials and labour - but there is an inevitable limitation upon the universal applicability of our method, that it can only produce such effects as are within the capacity of the surface-imprinting tools available.

The tools which we have already developed and use are rectangular (and usually square) in overall shape, having surface imprinting bars arranged thereon in various designs of pattern, but always such as to yield regular patterns of imprinting around imprint-free zones within the confines of each surface-imprinting tool, and essentially bounded by the periphery of that tool. The previously-used tools have imprinting bars running along only two of their four facets, since otherwise there would be a double-imprint between each pair of juxtaposed tools which would disfigure the overall

effect - but the tools are juxtaposed in the array so that the imprinting bar along the facet of one tool will close off the bar-free facet of the next adjacent juxtaposed tool, and hence the imprint-free zones created by one tool never merge with the imprint-free zones created by another tool.

The solution to one particular problem has however till now eluded us. A very popular traditional form of paving is that known in English-speaking countries as "crazy-paving", that is to say an assembly of individual paving-stone fragments laid by the skill of the pavier in an entirely-random manner and devoid of any repetitive pattern, discernible or at all. An array of identical surface-imprinting tools, each having imprinting bars in a regular arrangement, leads inevitably to a very discernible pattern in the imprinted surface, utterly different from the random arrangement in crazy-paving; yet, on the other hand, the mass-production of surface-imprinting tools, usually by a moulding or casting technique, becomes a practical impossibility unless there are only very few different patterns of tool, and indeed very desirably only just one. The formation of a "crazy-paving" effect by our method has therefore till now seemed to be a practical impossibility.

We have however now found that these seemingly conflicting considerations can be to a large extent

reconciled by providing a single design of multiple-faceted surface-imprinting tool, with a web of asymmetric imprinting bars disposed so as to define differing, irregular imprint-free zones associated with but unbounded by each said facet, and by assembling an array of a number of juxtaposed such tools in which at least most and preferably all of the differing imprint-free zones upon one tool are peripherally-unbounded and randomly juxtaposed with any one of the differing, peripherally-unbounded, imprint-free zones on other juxtaposed tools. The overall effect thus obtained is perhaps not truly random, but certainly it is quasi-random in the sense that the eye can seldom if ever discern any repetitive pattern in the resultant paving, which for practical purposes is therefore closely akin to so-called "crazy paving".

According to the invention we therefore provide a surface-imprinting tool, for imprinting a quasi-random pattern in the planar surface of setting but still unset concrete-type material, which tool comprises an asymmetric web of interconnected pattern-imprinting bars with their imprinting edges disposed in an imprinting plane, all the bars in said web lying wholly within the confines of a notional multi-faceted close-packable polygonal outline with each bar extending to a bar-termination located at either a facet-intersection or a facet-fraction point on the periphery of said polygonal outline, there being an imprinting-bar running

consecutively but indirectly from each bar-termination to the next-adjacent bar-termination all around the periphery of the tool thus defining an inwardly-closed but normally peripherally-unbounded imprint-free zone between each pair of next-adjacent bar-terminations all around the polygonal outline, whereby a number of essentially-similar and usually identical such surface-imprinting tools may be juxtaposed, in a close-packed array on the surface to be imprinted, with each bar-termination in one such tool registering with a bar-termination in another juxtaposed such tool, so as thus to merge the imprint-free zone of one tool with that of another and so to define wholly-closed, imprint-free areas between the mutually-registered next-adjacent bar-terminations upon any two or more juxtaposed such tools, and in which the bars are irregularly disposed in an asymmetrical web so that contiguous imprint-free zones on the tool are of perceptibly different overall shape.

Theoretically it is possible to envisage any reasonable number of bar-terminations per facet; but as the number of bar-terminations per facet increases the appearance of the imprinted pattern becomes less random and the tool tends to increase in size so that its handlability is impaired. For these reasons we consider that the practical upper limit of bar-terminations per facet is about three, while we prefer to provide only one or at most two bar-terminations per

facet, located at the facet-intersection and/or the halfway facet-midpoints. Our preferred construction, for reasons of strength and handlability, has bar-terminations only at the facet-intersection points.

It is not impossible for the web of interconnected pattern-imprinting bars in said tool to define one or even several wholly-closed imprint-free zones within the confines of the tool itself.

An occasional straight-line imprint corresponding to an imprinting bar disposed along a peripheral facet of the tool may sometimes be acceptable as long as it does not result in regularity of pattern becoming obviously discernible; and thus a minor proportion of the normally-unbounded peripheral imprint-free zones may be bounded by a peripheral imprinting-bar, provided this is not the case with next-adjacent imprint-free zones. This however is not recommended, since one must avoid a double-imprint caused by juxtaposed peripheral imprint-bars, and this necessity curtails the freedom with which otherwise the tools may be juxtaposed.

A slightly more acceptable possibility is to have the imprinting-bars define one or possibly a few wholly-closed imprint-free zones more or less centrally of the tool. Even this possibility is however one which we prefer to avoid, since it tends to diminish the random appearance of the finished paving.

Accordingly we much prefer that the asymmetric web of imprinting-bars shall define only inwardly-closed but

peripherally-unbounded imprint-free zones.

The tool must be capable of participating in a close-packed array of generally-similar (but not necessarily identical) other such tools. One can thus envisage the use of irregular polygonal outlines, provided other non-identical but complementary tools are available to fill in the gaps which otherwise might occur in the close-packed array. Indeed, the provision of such complementary tools may in some instances (when the overall outline of each tool is non-rectangular) be necessary to achieve a straight edge on the imprinted area. It is nevertheless preferred that the polygonal outline of the tool (within which all the bars lie) should be that of a regular close-packable polygon.

To achieve close-packing in a juxtaposed array of identical tools having the outline of a regular polygon without the use of complementary tools (except perhaps along the edge of the array, so as to achieve a straight edge therealong) the regular polygonal outlines employed must be those of an equilateral triangle, a square or a regular hexagon; and because the apparent randomness of the imprint increases with the number of facets, and also for reasons of handlability, we prefer an arrangement in which the bars lie within the confines of a regular hexagonal outline.

While it is possible to envisage an imprinting

tool which consists only of the web of imprinting bars, at the practical level it is very desirable that the tool should also include reinforcing members, attached to or integral with the pattern-imprinting bars, and disposed and arranged in a plane parallel to the imprinting plane but spaced apart therefrom on the side remote from the surface to be imprinted. Such reinforcing members will advantageously consist of or include a peripheral support-frame, attached to or integral with the bar-terminations and which thus serves to support and reinforce the pattern-imprinting bars.

In order to facilitate the assembly of an array of juxtaposed tools upon the surface to be imprinted, it is most advantageous if each such tool also includes abutment members corresponding to at least some and preferably all of the facets in the polygonal outlines, these abutment members being desirably arranged in a plane parallel to but spaced apart from the imprinting plane, each such member having an abutment face thereon disposed normal to the imprinting plane and in the line of a facet of the polygonal outline, so that each such abutment face may be registered with a similar abutment face upon a juxtaposed similar such tool.

The most convenient arrangement is to provide such abutment faces upon the previously-mentioned peripheral support-frame, with the external abutment faces upon said support-frame then coinciding with the polygonal outline within which the web of pattern-imprinting bars

is confined.

The pattern-imprinting edges of said pattern-imprinting bars are preferably of rounded, substantially frusto-conical cross-section.

It is not impossible for some non-contiguous imprint-free areas to be of similar overall shape, but maximum 'randomness' of appearance is achieved by the most preferred arrangement in which the pattern-imprinting bars are so disposed and arranged in the asymmetrical web that all the contiguous imprint-free zones defined thereby on the tool are of perceptibly different overall shape from all the others.

The whole tool is advantageously constructed in the form of a single casting or moulding made from any hard, durable material which is resistant to both impact and abrasion. For reasons of handlability the tool if made from metal is best cast from an aluminium alloy; but at present we prefer to construct the tool by moulding it from acrylic resins.

According to another aspect of the invention there is also provided a method of imprinting the surface of un-set, concrete-type material which involves the successive steps of (a) forming an underlying, load-bearing foundation layer, (b) pouring thereon a layer of wet concrete-type mixture, (c) tamping and screeding that layer to form a smooth cement/sand surface thereon, (d) optionally but usually scattering mineral pigments

upon said still-unset surface, trowelling in said pigments and again tamping and screeding the pigmented surface of the wet cement/sand mixture, (e) covering the still only semi-set surface with a deformable synthetic resin membrane, (f) assembling an array of juxtaposed surface-imprinting tools as herein described over the membrane-covered surface and impacting them to imprint the surface through the membrane, then (g) removing the array of surface-imprinting tools and the synthetic-resin membrane from its thus-imprinted surface, and optionally but desirably (h) applying an appropriate sealant to the smooth, set, pigmented and imprinted surface.

In order that the invention may be well understood it will now be described in more detail, though only for purposes of illustration, with reference to the accompanying drawings, in which:

Figure 1a illustrates the simplest-possible surface-imprinting tool in accordance with this invention, in the most basic form of a web of pattern-imprinting bars (thus without any support-frame or other desirable features) seen in overhead plan view, the bars all confined within the outline (shown in broken line) of a notional equilateral triangle and having their bar-terminations at the facet-intersections (apices) of that triangle; while

Figure 1b is an overhead plan view of one possible assembly of a number of the tools shown in Figure 1a

into a close-packed array;

Figure 2a similarly illustrates the next-simplest tool of the invention, in the form of a similar web also seen in overhead plan view, the bars all confined within the outline (shown in broken line) of a notional square and having their bar-terminations at the facet-intersections (corners) of that square; while

Figure 2b is an overhead plan view of one possible assembly of a number of the tools shown in Figure 2a into a close-packed array;

Figure 3a in a similar way illustrates the most complex tool of this invention (still however in its most basic form, thus without any support-frame or other desirable features) seen in overhead plan view, the bars all confined within the outline (shown in broken line) of a notional regular hexagon and having their bar-terminations at the facet-intersections of that hexagon; while

Figure 3b is an overhead plan view of one possible assembly of a number of the tools shown in Figure 3a into a close-packed array;

Figure 4 illustrates another simplest-possible surface-imprinting tool, again seen in overhead plan view and in other respects similar to that of Figure 1a but in which the bars have their bar-terminations at the half-way mid-points of the facets of the equilateral triangle;

Figure 5a similarly illustrates another next-simplest tool of the invention, again seen in overhead plan view and in other respects similar to that of Figure 2a but in which the bars have their bar-terminations at the half-way mid-points of the facets of the square; while

Figure 5b is an overhead plan view of one possible assembly of a number of the tools shown in Figure 5a into a close-packed array;

Figure 6a in a similar way illustrates the most complex tool of this invention (still however in its most basic form, thus without any support-frame or other desirable features) again seen in overhead plan view and in other respects similar to that of Figure 3a but in which the bars have their bar-terminations at the half-way mid-points of the facets of the regular hexagon; while

Figure 6b is an overhead plan view of one possible assembly of a number of the tools shown in Figure 6a into a close-packed array;

Figure 7a is an underneath plan view (thus as seen from the imprinting plane side) on an enlarged scale of the hexagonal-outline web of pattern imprinting bars in the currently-preferred embodiment of surface-imprinting tool according to this invention; while

Figure 7b shows the same view of a tool otherwise identical to that of Figure 7a but which also includes a peripheral facet-defining support-frame; and

Figure 7c shows the same view of a tool otherwise identical to that of Figure 7b but which also additionally includes reinforcing struts;

Figure 8 is a perspective view from below and one side of the tool shown in Figure 7c;

Figure 9 is an overhead plan view of the tool shown in Figure 7c and 8;

Figure 10 is a partially-sectional view taken on the line I-I through Figure 9;

Figure 11 is a side-elevation, normal to one facet of its periphery, of the tool illustrated in Figures 7c to 10; and

Figures 12a to 12g show successive stages in the sequence of operations carried out in accordance with the method of this invention to lay and imprint a concrete surface.

Figure 13 shows a diagrammatic perspective view of the result obtained after the successive stages as illustrated in Figures 12a to 12g.

Referring first to Figures 1a and 1b, it will be seen that the simplest-possible surface-imprinting tool there illustrated consists of a web 1 of imprinting bars confined within the outline of a notional equilateral triangle 2 (shown in broken lines) with their bar-terminations 3, 3' and 3" at the facet-intersections or apices of that equilateral triangle. Within the confines of the notional triangle 2 the web 1 of

imprinting bars defines three visually distinct inwardly-closed but peripherally-unbounded imprint-free zones, indicated respectively as A, B and C. As can best be seen from Figure 1b, by assembling an array of identical such imprinting tools in rotationally-different orientations relative to one another, the wholly-closed imprint-free areas created by merging the imprint-free zones in two juxtaposed tools may take 6 different forms identifiable as AA, AB, AC, BB, BC, and CC.

Referring now to Figures 2a and 2b, the next-simplest tool there illustrated again consists of a web 11 of imprinting bars confined within the outline of a notional square 12 (shown in broken lines) with their bar-terminations 13, 13', 13" and 13''' at the facet-intersections or corners of that square. Within the confines of the notional square 12 the web 11 of imprinting bars defines four visually-distinct inwardly-closed but peripherally-unbounded imprint-free zones, indicated respectively A', B', C' and D'. As can be seen from Figure 2b, by assembling an array of identical such imprinting tools in rotationally-different orientations relative to each other the wholly-closed imprint-free areas created by merging the imprint-free zones in two juxtaposed tools may take 10 different forms identifiable as A'A', A'B', A'C', A'D', B'B', B'C', B'D', C'C', C'D' and D'D'.

Referring then to Figures 3a and 3b, the most-

complex of the surface-imprinting tools of this invention (though still in its most basic form) as there illustrated consists of a web 21 of imprinting bars confined within the outline of a notional regular hexagon 22 (shown in broken lines) with their bar-terminations 23a-23f at the facet-intersections of that hexagon. Within the confines of the notional hexagon 22 the web 21 of imprinting bars define six visually-distinct inwardly-closed but peripherally-unbounded imprint-free zones, indicated respectively A", B", C", D", E" and F". As can be seen from Figure 3b, by assembling an array of identical such tools in rotationally-different orientations relative to each other the wholly-closed imprint-free areas created by merging the imprint-free zones in two juxtaposed tools may take 21 different forms identifiable as A"A", A"B", A"C", A"D", A"E", A"F", B"B", B"C", B"D", B"E", B"F", C"C", C"D", C"E", C"F", D"D", D"E", D"F", E"E", E"F" and F"F".

Referring to Figure 4, this illustrates an alternative tool, generally similar to that of Figure 1a (and therefore using the same reference numerals and letters) but in which the web 1 of imprinting bars within the notional equilateral triangle 2 (shown in broken lines) has its bar-terminations 3, 3' and 3" arranged at the facet-midpoints. With an alternative tool of this nature it will be appreciated that a

wholly-closed imprint-free area can be created by merging the imprint-free zones on no less than six apically-juxtaposed such tools, and the variety of resultant imprint-free areas available are identifiable as AAAAAA, AAAAAB and so on - but although the possible variety is considerable, the degree of variation between one imprint-free area and another is often quite slight and therefore not very perceptible, so that the overall effect tends to be monotonous - and has not been further illustrated.

Referring to Figures 5a and 5b, it will be seen that Figure 5a illustrates an alternative tool, generally similar to that of Figure 2a (and therefore using the same reference numerals and letters) but in which the web 11 of imprinting bars within the notional square 12 (shown in broken lines) has its bar-terminations 13, 13', 13" and 13''' arranged at the facet-midpoints. With this alternative arrangement a wholly-closed imprint-free area can be created by merging the imprint-free zones on four such tools juxtaposed corner-to-corner, and the variety of resultant imprint-free areas available are identifiable as A'A'A'A', A'A'A'B' and so on - as illustrated for instance in Figure 5b.

Referring to Figures 6a and 6b it will be seen that Figure 6a illustrates an alternative tool, generally similar to that of Figure 3a (and therefore using the same reference numerals and letters) but in

which the web 21 of imprinting bars within the natural hexagon 22 (shown in broken lines) has its bar terminations 23a, 23b, 23c, 23d, 23e and 23f arranged at the facet-midpoints. With this alternative arrangement a wholly-closed imprint-free area can be created by merging the imprint-free zones on three such tools juxtaposed corner-to-corner, and the variety of resultant imprint-free areas available, are identifiable as A"A"A", A"A"B", A"A"C", A"A"D", A"A"E", A"A"F", A"B"A", A"B"B", A"B"C", A"B"D", A"B"E", A"B"F", A"C"A" and so on - for instance as illustrated in Figure 6b.

Figures 7 to 11 show the currently-preferred embodiment of hexagonal outline surface imprinting tool 24.

Figures 7a to 7c illustrate variations on a web of pattern-imprinting bars 25 confined within a notional hexagonal outline which imprinting bars 25 incorporate a printing edge 26. In Figure 7a the imprinting bars 25 are irregularly disposed in an asymmetrical web so that contiguous imprint-free zones 27 on the tool are perceptibly a different overall shape. Figure 7b represents essentially the same as Figure 7a, though with the addition of a peripheral support frame 28 which is attached to the bar terminations and which thus serves to support and reinforce the pattern-imprinting bars 25. In Figure 7c there is a further addition of reinforcing struts 29 which are disposed in the frame 28

parallel to the imprinting plane but which are spaced apart therefrom on the side away from the surface to be imprinted, these act as additional support and reinforcement for the pattern-imprinting bars 25.

Referring now to Figures 8 to 11 and firstly to Figure 8, there is seen a perspective view of the preferred embodiment of hexagonal outline surface imprinting tool 24, which clearly illustrates the frame 28, reinforcing struts 29, imprinting bars 25 with edges 26, which outline the imprint zones 27. Additionally, there are abutment members 30, corresponding to all facets in the hexagonal outline and arranged in a plane parallel to but spaced apart from the imprinting plane and which assist in the juxtaposition of the imprinting tools 24. The abutment members 30 have faces which are arranged in a plane normal to the imprinting plane, and each face registers with a face of the abutment member of the next adjacent imprinting tool.

Figure 9 illustrates an overhead plan view of the imprinting tool 24 and includes hammering bosses 36 distributed at the intersections and terminations of the imprinting bars 25 in order to provide a surface upon which to impact the imprinting tool 24.

Referring to Figures 12a to 12g it can be seen that it requires a successive sequence of steps in order to accomplish the imprinting of a prepared surface with the use of the imprinting tool 24. In Figure 12a, the area which is to be surface-imprinted is first cleared

and levelled. Following this levelling the surface is provided with a load-bearing foundation layer 31 as shown in Figure 12b. After this layer 31 has been laid, a wet concrete-type mixture 32 is poured thereon, subsequently the concrete-type mixture 32 is tamped and screeded as shown in Figure 12c in order to form therewith a smooth cement/sand surface 33. After having provided a smooth surface upon which to imprint, a mineral pigment, for example a Bayferrox pigment is then scattered upon the still-unset surface, being mixed into the surface by the use of a trowel. Then, again the pigmented surface is tamped and screeded. It is possible with the use of different Bayferrox pigments to produce a variation in colour pigment, such as black with Bayferrox 318, brown with Bayferrox 663, red with Bayferrox 130, yellow with Bayferrox 920, blue with Light Blue 100 and green with Chrome Oxide Green GN to mention but a few, and the colour used is obviously dependent upon any particular request. Such pigments are available from Bayer AG, GB-Anorganica D-5090 Leverkusen, West Germany. Next, the still semi-set smooth cement/sand surface 33 is covered with a thin, deformable synthetic resin membrane 34. Once this membrane 34 is in place across the surface to be imprinted, the surface-imprinting tools 24 are assembled in an array, juxtaposed one to another until the imprinting tools 24 completely cover the required area.

These imprinting tools 24 are then gently impacted upon the membrane 34 in order to imprint the semi-set smooth cement/sand surface 32, as shown in Figure 12e. Then, the array of imprinting tools 24, and the synthetic resin membrane 34 are removed from the then imprinted cement/sand surface 33, to reveal a "crazy-paving" effect. Finally, once the cement/sand surface 33 is set an appropriate sealant is applied to the smooth, set, pigmented and imprinted surface. The sealant used may be for example the most suitable Acryloid Thermoplastic Acrylic resin and may act to protect the finish of the cement/sand imprinted surface and also aid against deterioration of the colour pigment. The overall effect thus obtained is in the form of "crazy-paving" which can be clearly seen in Figure 13. This "crazy-paving" is perhaps not truly random, although the result as can be seen is certainly quasi-random in the sense that the eye can seldom if ever discern any repetitive pattern in the resultant paving.

CLAIMS

1. A surface-imprinting tool, for imprinting a quasi-random pattern in the planar surface of un-set, concrete-type material, which tool comprises an asymmetric web of interconnected pattern-imprinting bars with their imprinting edges disposed in the imprinting plane, all the bars in said web lying wholly within the confines of a notional multi-faceted close-packable polygonal outline with each bar extending to a bar-termination at either a facet-intersection or a facet-fraction point on the periphery of said polygonal outline, there being an imprinting-bar running consecutively but indirectly from each bar-termination to the next-adjacent bar-termination all around the periphery of the tool thus defining an inwardly-closed but normally peripherally-unbounded imprint-free area between each pair of next-adjacent bar-terminations all around the polygonal outline, whereby a number of essentially-similar and usually identical such surface-imprinting tools may be juxtaposed, in a close-packed array on the surface to be imprinted, with each bar-termination in one such tool registering with a bar-termination in another juxtaposed such tool, so as thus to define wholly-closed, imprint-free areas between the mutually-registered next-adjacent bar-termination points

upon any two or more juxtaposed such tools, and in which the bars are irregularly disposed in an asymmetrical web so that contiguous imprint-free areas on the tool are of perceptibly different overall shape.

2. A tool as claimed in claim 1, in which there are bar-terminations at the facet-intersection and/or the halfway facet-midpoints.

3. A tool as claimed in claim 1 or claim 2, in which there are bar-terminations only at the facet-intersection points.

4. A tool as claimed in any of the preceding claims, in which the asymmetric web of imprinting-bars in said tool define only inwardly-closed but peripherally-unbounded imprint-free areas.

5. A tool as claimed in any of the preceding claims, in which all the imprinting-bars lie within the confines of a regular close-packable polygonal outline.

6. A tool as claimed in claim 5, in which the imprinting-bars lie within the confines of a regular hexagonal outline.

7. A tool as claimed in any of the preceding claims which includes reinforcing members, attached to or integral with the pattern-imprinting bars, and disposed and arranged in a plane parallel to the imprinting plane but spaced therefrom on the side remote from the surface to be imprinted, which support members are attached to or integral with the pattern-imprinting bars.

8. A tool as claimed in claim 7, in which the reinforcing members consist of or include a peripheral support-frame, attached to or integral with the bar-terminations.

9. A tool as claimed in any of the preceding claims, which also includes abutment members corresponding to at least some of the facets in the polygonal outline, said abutment members being arranged in a plane parallel to but spaced from the imprinting plane, and each having an abutment face thereon disposed normal to the imprinting plane and in the line of a facet of the polygonal outline, whereby each such abutment face may be registered with a similar abutment face upon a juxtaposed similar such tool.

10. A tool as claimed in claims 8 and 9, in which the abutment faces are provided upon the peripheral support-frame, the external abutment faces upon said support-frame coinciding with and defining the polygonal outline within which the web of imprinting-bars is confined.

11. A tool as claimed in any of the preceding claims which includes bosses on the side thereof remote from the imprinting plane, whereby the tool in use may be hammered or otherwise impacted into the concrete-type surface to be imprinted.

12. A tool as claimed in any of the preceding claims, in which the pattern-imprinting edges of said imprinting- bars are of rounded, substantially frusto--conical cross-section.

13. A tool as claimed in any of the preceding claims, in which the imprinting-bars are so disposed and arranged in the asymmetrical web that all the contiguous imprint-free areas defined thereby on the tool are of perceptibly different overall shape from all the others.

14. A tool as claimed in any of the preceding claims, all of which takes the form of a single casting or moulding.

15. A tool as claimed in claim 14, wherein the single casting or moulding is made from acrylic resin.

16. A tool for imprinting a quasi-random pattern in the surface of un-set, concrete-type material, as claimed in any of the preceding claims and substantially as herein described.

17. A tool for imprinting a quasi-random pattern in the surface of un-set, concrete-type material, substantially as herein described with reference to the accompanying drawings.

18. A method of imprinting the surface of un-set, concrete-type material which involves the successive steps of (a) forming an underlying, load-bearing foundation layer, (b) pouring thereon a layer of wet concrete-type mixture, (c) tamping and screeding that layer to form a smooth cement/sand surface thereon, (d) optionally but usually scattering mineral pigments upon said still-unset surface, trowelling in said pigments and again tamping and screeding the pigmented surface of

the wet cement/sand mixture, (e) covering the still only semi-set surface with a deformable synthetic resin membrane, (f) assembling an array of juxtaposed surface-imprintng tools as claimed in any of the preceding claims over the membrane-covered surface and impacting them to imprint the surface through the membrane, then (g) removing the array of surface-imprinting tools and the synthetic-resin membrane from its thus-imprinted surface, and optionally but desirably (h) applying an appropriate sealant to the smooth, set, pigmented and imprinted surface.

19. A method of imprinting the surface of un-set, concrete-type material as claimed in claim 18 and substantially as herein described.

20. A method of imprinting the surface of un-set, concrete-type material substantially as herein described with reference to the accompanying drawings.

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